REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 15-31 are in the case.

I. THE INTERVIEW

At the outset, the undersigned wishes to thank the Examiner (Mr. Singh) for kindly discussing this case. The interview was held on November 30, 2007 and the courtesies extended by the Examiner were most appreciated. The substance of the interview will be clear from the comments presented below.

II. THE OBVIOUSNESS REJECTION

Claims 15-31 remain rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent 6,048,451 to Huff, Jr., et al. (Huff). That rejection is respectfully traversed.

As discussed during the interview, the process as claimed in claim 15 is for increasing the boiling point of organic nitrogen species present within a liquid hydrocarbon feed. The process comprises contacting a liquid hydrocarbon feed comprising an alkylating agent and organic nitrogen species, the liquid hydrocarbon feed being one or more petroleum fractions with a boiling range of 10-450°C selected from catalytically cracked naphtha, coker naphtha and visbroken naphtha, with an acidic catalyst at elevated temperature in a first reaction zone to generate a liquid hydrocarbon feed comprising a reduced alkylating agent content and organic nitrogen species of higher boiling point.

Claim 16 claims a process for removing organic nitrogen compounds from a hydrocarbon feedstock in which, as a first step, a hydrocarbon feedstock comprising an alkylating agent and organic nitrogen compounds is contacted with an acid catalyst at elevated temperature to produce organic nitrogen compounds of higher boiling point.

Prior to the present invention, the approach in the art was to remove nitrogen compounds from hydrocarbon streams before contacting the streams with an acid catalyst to remove organic sulfur compounds. Thus, the skilled artisan would have been motivated to protect an acid catalyst by prior removal of basic nitrogen-containing compounds. This is also consistent with Huff which discloses that nitrogen-containing compounds must be removed from the hydrocarbon stream prior to contact of the stream with the acidic catalyst used for reacting organic sulfur compounds.

Huff teaches that to achieve nitrogen removal, one can use conventional acid wash or guard-bed technology. For removal of basic nitrogen compounds, Huff teaches that an acidic material should be used, as it will be expected to entrap/absorb the basic nitrogen compounds. Once the absorbent is "full" or "spent", it is regenerated and reused. Often, a dual absorbent bed is used, such that one absorbs while the other is regenerated in order to provide continuity (see Huff at column 10, lines 55 to 62).

In contrast, as explained during the interview, according to the present invention, it has been found that acidic compounds can act catalytically and facilitate reaction of the nitrogen-containing compounds to produce organic nitrogen compounds of higher boiling point. For example, it has been discovered that under the conditions of acidic catalysis, organic nitrogen species can condense with each other, they can react with aromatic species, or can react with an alkylating agent. The result is the formation of

organic nitrogen species of higher boiling point (see, for example, page 1 lines 15-18 of the application). The present inventors realized that this could be used to advantage, in that the higher-boiling nitrogen compounds so-produced remain in the hydrocarbon stream, where they can then be readily separated by techniques such as distillation.

Turning to the Advisory Action, it is stated on page 2: "Thus, nitrogen removal in the Huff process is similar to Applicant's claim". In response, the processes are not "similar", since Huff teaches nitrogen **removal** from the liquid hydrocarbon stream **prior** to contact of the liquid hydrocarbon with the acid catalyst whereas, in the presently claimed process, there is **no removal** of nitrogen prior to contact with the acid catalyst. Instead, as is clear from the claim language, nitrogen is present in the liquid hydrocarbon feed that is contacted with the acid catalyst. Thus, there is **no** similarity in "nitrogen removal" in the two processes.

On page 2 of the Advisory Action, it is further stated: "So the mechanism of nitrogen removal should be the same in both cases". In response, the mechanism of nitrogen removal is irrelevant to the issue of obviousness in view of Huff. The question is whether Huff renders obvious the presently claimed step of contacting the liquid hydrocarbon feed containing organic nitrogen species with the acid catalyst. It is applicants' position that Huff does not render that step obvious because Huff leads the person of ordinary skill to **remove** nitrogen species **prior** to contacting with the acid catalyst.

On page 2 of the Advisory Action, it is also stated: "As discussed earlier, nitrogen is being removed by using a solid catalyst similar to the solid catalyst used to remove sulfur downstream", and "Huff process must also be converting the nitrogen compounds

to other nitrogen compounds of higher boiling point...". Again, the fundamental question of whether it would have been obvious in view of Huff to contact a liquid hydrocarbon feed containing organic nitrogen species with an acid catalyst. It is applicants' position that Huff does **not** render that step obvious because Huff leads the skilled artisan to remove nitrogen species **prior** to contacting with the acid catalyst.

As discussed during the interview, Huff does not suggest the claimed step of contacting "a hydrocarbon feedstock comprising an alkylating agent and organic nitrogen compounds" at elevated temperature with an acid catalyst "to produce organic nitrogen compounds of higher boiling point". Huff discloses that organic nitrogen compounds can cause catalyst deactivation and, hence, are **removed prior** to contact with the acidic catalyst in order to prevent damage to the acid catalyst (see, column 10, lines 54-67). This removal of organic nitrogen compounds is stated to be achieved by conventional means, such as by using an acid wash or a guard bed positioned in front of the acid catalyst. There is no suggestion in Huff of producing organic compounds of higher boiling point. This is in marked contrast to the presently claimed process, wherein the liquid hydrocarbon stream to be contacted with the acidic catalyst comprises "organic nitrogen species". The liquid hydrocarbon stream to be contacted by the acid catalyst in Huff does **not** contain organic nitrogen species, and there is **no** suggestion to one of ordinary skill to modify Huff in such a way that the Huff liquid hydrocarbon stream which contacts the acid catalyst does contain organic nitrogen species.

In the present process, by contacting a hydrocarbon feedstock comprising alkylating agent with an acid catalyst at elevated temperature, organic nitrogen species

within the hydrocarbon feedstock are converted to organic nitrogen species of increased boiling point. This is **not** suggested by Huff and, indeed, Huff leads away from this approach by disclosing that, since nitrogen-containing organic compounds can react with the acidic catalyst and deactivate it (column 10, lines 48-51), the nitrogen-containing compounds are removed **beforehand** by another means such as by using an acid wash or a guard bed positioned in front of the acid catalyst.

Thus, one of ordinary skill in the art, based on Huff, would **not** have been motivated to contact nitrogen-containing organic compounds with an acidic catalyst in view of the risk of catalyst deactivation. In light of this, in Huff, organic nitrogen is removed via the acid wash/guard bed treatment **before** contact with the acidic catalyst. In particular, Huff discloses at column 10, lines 54-59 that organic nitrogen species are removed from the feedstock before being contacted with the acid catalyst by using conventional guard bed or acid wash technology. Guard beds and acid wash units are well known to those skilled in the art and operate by absorption, not by catalysis. This is evidenced by Huff at column 10, lines at 59-65, where regeneration of the guard bed or acid wash is discussed.

The Action asserts that it would have been obvious to modify Huff to remove nitrogen compounds also by fractionation "because any suitable separation technique will be equally effective." This is not correct, because contacting nitrogen containing compounds with the acidic catalyst runs the risk of deactivation of the catalyst which would **not** be seen by one of ordinary skill as "equally effective". The suggestion in the Action to so modify Huff is clearly based on hindsight in light of the discovery of the present invention, which is not proper basis for rejection.

In summary, Huff leads away from the concept of increasing the boiling point of organic nitrogen species by contact with an acidic catalyst because of problems with catalyst deactivation and, instead, points to removal of nitrogen-containing compounds using guard beds and acid wash units prior to contact with the acidic catalyst . Based on Huff, the person of ordinary skill would understand that the guard bed/acid wash treatment serves to remove organic nitrogen compounds, and does not convert them to other organic nitrogen compounds of higher boiling point.

In light of the above, one of ordinary skill in this art would not have been motivated to arrive at the presently claimed invention based on the Huff disclosure, as there would have been no motivation to contact a liquid hydrocarbon stream comprising organic nitrogen with an acidic catalyst due to the problem of catalyst deactivation. Absent any such motivation, it is clear that a *prima facie* case of obviousness has not been generated in this case. Reconsideration and withdrawal of the outstanding obviousness rejection are accordingly respectfully requested.

Favorable action is awaited.

Respectfully submitted,

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